IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Docket No.: **TI-34792**
Udi Suissa	Examiner: **Fotakis, Aristocratis**
Serial No.: **10/766,448**	Art Unit: **2611**
Filed: **01/27/2004**	Conf. No.: **3215**

For: **FREQUENCY OFFSET COMPENSATION IN A DIGITAL FREQUENCY SHIFT KEYING RECEIVER**

APPELLANTS' BRIEF – 37 C.F.R. § 41.37

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is submitted in connection with the above-identified application in response to the final Office Action of April 15, 2009 and the Office communication of 04/27/2009.

I. REAL PARTY IN INTEREST

Texas Instruments Incorporated is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of pending appeals in related applications.

III. STATUS OF CLAIMS

Claims 1 and 9 are canceled. Claims 2-8 and 10-20 are pending in the application. Claims 10-20 are allowed. Rejection of Claims 2-8 was made by the Examiner in the Office Action dated April 15, 2009. Claims 2-8 are on appeal. Claims 2-8 are reproduced in the Appendix to Appellants' Brief filed herewith.

IV. STATUS OF AMENDMENTS

All Amendments have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

In one embodiment, Claim 2 requires and positively recites, a method of frequency offset compensation, said method comprising the steps of:

receiving an input signal wherein frequency offsets have been translated to DC offsets ([0033] lines 7-8; [0039] lines 12 & 3-4);

first determining a current maximum peak value of said input signal ([0043] lines 5-6; [0044] lines 3-12; [0045] lines 1-4);

second determining a current minimum peak value of said input signal ([0048] lines 5-6; [0046] lines 1-7; [0047] lines 1-3);

calculating an average of said current maximum peak value and said current minimum peak value to yield a DC offset estimate ([0048] lines 1-2); and

subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal ([0048] lines 5-7);

wherein said step of determining said current maximum peak value comprises the steps of:

comparing said input signal with a previous maximum peak value ([0044] lines 6-7);

if said input signal is greater than said previous maximum peak value, adding said previous maximum peak value to a first difference between said input signal and said previous maximum peak value, said first difference multiplied by a maximum charge coefficient to yield said current maximum peak value ([0044] lines 8-11); and

if said input signal is not greater than said previous maximum peak value, subtracting a second difference between said previous maximum peak value and said input signal multiplied by a maximum discharge coefficient from said previous maximum peak value to yield said current maximum peak value ([0045] lines 1-4).

In another embodiment, Claim 5 requires and positively recites, a method of frequency offset compensation, said method comprising the steps of:

receiving an input signal wherein frequency offsets have been translated to DC offsets ([0033] lines 7-8; [0039] lines 12 & 3-4);

first determining a current maximum peak value of said input signal ([0043] lines 5-6; [0044] lines 3-12; [0045] lines 1-4);

second determining a current minimum peak value of said input signal ([0048] lines 5-6; [0046] lines 1-7; [0047] lines 1-3);

calculating an average of said current maximum peak value and said current minimum peak value to yield a DC offset estimate ([0048] lines 1-2); and

subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal ([0048] lines 5-7);

wherein said step of determining said current minimum peak value comprises the steps of:

comparing said input signal with a previous minimum peak value;

if said input signal is not greater than said previous minimum peak value, subtracting a first difference between said previous minimum peak value and said input signal, said first difference multiplied by a minimum discharge coefficient and subtracted

from said previous minimum peak value to yield said current minimum peak value ([0046] lines 3-6); and

if said input signal is greater than said previous minimum peak value, adding said previous minimum peak value to a second difference between said input signal and said previous minimum peak value, said second difference multiplied by a minimum charge coefficient to yield said current minimum peak value ([0047] lines 1-4).

VI. <u>GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL</u>

Do Claims 2-8 fall within one of the four statutory categories of invention under 35 U.S.C. § 101?

VII. <u>ARGUMENTS</u>

Independent Claim 2 requires and positively recites, a method of frequency offset compensation, said method comprising the steps of: "**<u>receiving an input signal</u> wherein frequency offsets have been translated to DC offsets**", "first determining a current maximum peak value of said input signal", "second determining a current minimum peak value of said input signal", "**calculating an average of said current maximum peak value and said current minimum peak value to yield a DC offset estimate**" and "**<u>subtracting said DC offset estimate from said input signal</u> <u>to yield a frequency compensated output signal</u>**", "wherein said step of determining said current maximum peak value comprises the steps of: comparing said input signal with a previous maximum peak value; if said input signal is greater than said previous maximum peak value, **<u>adding</u> said previous maximum peak value to a first difference between said input signal and said previous maximum peak value, said first difference multiplied by a maximum charge coefficient to yield said current maximum peak value**; and if said input signal is not greater than said previous maximum peak value, **subtracting a**

second difference between said previous maximum peak value and said input signal multiplied by a maximum discharge coefficient from said previous maximum peak value to yield said current maximum peak value".

Independent Claim 5 requires and positively recites, a method of frequency offset compensation, said method comprising the steps of: "receiving an input signal **wherein frequency offsets have been translated to DC offsets**", "first determining a current maximum peak value of said input signal", "second determining a current minimum peak value of said input signal", "calculating an average of said current maximum peak value and said current minimum peak value **to yield a DC offset estimate**" and "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**", "wherein said step of determining said current minimum peak value comprises the steps of: comparing said input signal with a previous minimum peak value; if said input signal is not greater than said previous minimum peak value, **subtracting a first difference between said previous minimum peak value and said input signal, said first difference multiplied by a minimum discharge coefficient and subtracted from said previous minimum peak value to yield said current minimum peak value**; and if said input signal is greater than said previous minimum peak value, **adding said previous minimum peak value to a second difference between said input signal and said previous minimum peak value, said second difference multiplied by a minimum charge coefficient to yield said current minimum peak value**".

"[w]heather a claim is drawn to patent-eligible subject matter under 35 U.S.C. § 101 is a threshold inquiry, and any claim of any claim of an application failing the requirements of § 101 must be rejected even if it meets all of the other legal requirements of patentability." In re Bilski, 545 F.3d 943, 952 (Fed. Cir. 2008)(en banc). The Federal Circuit stated that the Supreme Court's machine-or-transformation test is the "definite test to determine whether a process claim is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself." Id. At 954. As the Federal Circuit phrased the machine-or-transformation test in Bilski:

> A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.

Id. (emphasis in original)(citing Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Diamond v. Diehr, 450 U.S. 175, 192 (1981); Parker v. Flook, 437 U.S. 584, 589 n. 9 (1978); Cochrane v. Deener, 94 U.S. 780, 788 (1876)).

The limitation "**an input signal** wherein frequency offsets have been translated to DC offsets" in independent Claims 2 & 5 represents an actual physical signal, i.e., a "concrete thing" that can be physically measured. The above input signal is NOT a "mental process", "phenomena of nature" or "abstract intellectual concept". Thereafter, that input signal or "concrete thing" is then transformed into a different state or thing by the step "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**", represents a transformation of the "input signal" into "a frequency compensated output signal" - which is a transformation of a concrete thing from one state to a different state or thing, which complies with "or (2) it transforms a particular article into a different state or thing", as set forth in Bilski. In addition to the above, Applicants respectfully submit that Claim 1 further complies with "(1) it is tied to a particular machine or apparatus", as set forth in Bilski, because a machine or apparatus would be required to perform the steps of "**receiving an input signal wherein frequency offsets have been translated to DC offsets**" and "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**". Accordingly, Claims 2 & 5 comply with the requirements of 35 U.S.C. § 101.

Examiner, however, makes the following two improper determinations in the most recent Office Action:

1) "the transformation of signal to a different state or thing is not the same as transforming a physical article or material to a different state" (OA dated 04/15/2009, page 6, lines 6-7);
2) "a signal itself does not have a physical embodiment but it is information data acted on" (OA dated 04/15/2009, page 6, lines 7-8).

Regarding Examiner's determination in #1 above that, "the transformation of signal to a different state or thing is not the same as transforming a physical article or material to a different state" (OA, page 6, lines 6-7), Applicants respectfully point out that Examiner agrees above that a "transformation of a signal to a different state or thing" is occurring in Claims 2 & 5. The only remaining question is how Examiner arrives at his further determination that "transforming a signal to a different state or thing is not the same as transforming a physical article or material to a different state"? Examiner cites no scientific evidence or case law support for his determination (meaning no prima facie case supporting his determination). Indeed, Examiner's determination is supposition not supported by fact – little more than improper hindsight reconstruction.

Regarding Examiner's determination in #2 above that, "a signal itself does not have a physical embodiment but it is information data acted on" (OA, page 6, lines 7-8), Applicants again respectfully point out that Examiner cites no scientific evidence or case law support for his determination. Indeed, Examiner's determination once again is supposition not supported by fact – little more than improper hindsight reconstruction. Examiner seems to be misconstruing the term "signal" to be nothing more than abstract "data". Applicants respectfully point out that in the step, limitation "**an input signal wherein frequency offsets have been translated to DC offsets**" the "input signal" has direct current (DC) offsets. As such, the "input signal" is not, and cannot be construed to be, nothing but "data", as determined by Examiner. Subsequent to the above, the additional step of: "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**", sets forth that the direct current (DC) offset estimate is subtracted from the "input signal" to yield a "frequency compensated output signal". Similarly, a "frequency compensated output signal" is not, and cannot be construed to be, nothing but "data", as determined by Examiner. Accordingly, both the "input signal" and the "frequency compensated output signal" both have physical embodiments with the "frequency compensated output signal" being the result of the "transformation of underlying subject matter (e.g., the "input signal") to a different state or thing (e.g., the "frequency compensated output signal"). Moreover, certainly a machine of some sort would be required to subtract direct current (DC) offsets **from said input signal to yield a frequency compensated output signal**, as required by

Claims 2 & 5. Accordingly, for the reasons set forth above, the 35 USC § 101 rejection of Claims 2 & 5 is improper and must be withdrawn.

Appellants further traverse the following further determinations by Examiner in the Office communication of 04/27/2009:

> *Examiner submits that whether the input signal is a DC offset, data or any other signal representation, ANY transformation or translation from one signal to another does not transform to a different state (i.e. it still remains a signal which is a form of energy)(Office communication dated 04/27/2009, page 2, lines 7-8).*

Examiner's determination above is preposterous. Examiner's reasoning seems at odds with the laws of physics. For example, a signal having a DC offset of 1 volt is at a different state than a signal having a DC offset of 100 volts. Therefore, if a signal having a DC offset of 1 volt is transformed (Examiner admits that the signal is "transformed") into a signal having a DC offset of 100 volts, the result signal having a DC offset of 100 volts is at a different "state" that it was before. Indeed, Examiner's determination would even deny that two signals having different energy rates would be at different "states" since both are "a form of energy". Further, Examiner's determination does not consider the change of one form of energy to another to be a "transformation to a different state"! Thus, burning wood to generate heat would not be a "transformation to a different state" under Examiner's reasoning since both are forms of energy! Examiner's determination is supposition not supported by fact – little more that unsupported, improper, hindsight reconstruction.

Moreover, even if, arguendo, Examiner were correct, Examiner's determination fails to follow the case law as set forth by the courts. The Federal Circuit stated that the Supreme Court's machine-or-transformation test is the "definite test to determine whether a process claim is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself." Id. At 954. As the Federal Circuit phrased the machine-or-transformation test in Bilski:

> A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.

Examiner bases his determination on the language "transforms a particular article into a different state". Yet even if he here correct, which he is not, he does not further address the issue as to whether the resulting transformed signal is a different "thing". Surely an "input signal wherein frequency offsets have been translated to DC offsets, that is then subject to the step of "subtracting said DC offset estimates from the input signal to yield a frequency compensated output signal" results in a transformation of the "input signal" to the "output signal" with the output signal being a different "thing" or "at a different state". Examiner's determination is simply erroneous.

> *Secondly, the input signal wherein the frequency offsets have been translated to DC offsets occurs before the signal has been received and is not tied to the claim (Office communication dated 04/27/2009, page 2, lines 9-10).*

Examiner's above determination fails to consider all of the words of the claim. The input signal has frequency offsets that have been translated to DC offsets. This means that the input signal is not, and cannot be construed to be, nothing but "data". Next, this input signal is subjected to having DC offset estimates "subtracted" from the input signal to yield a "frequency compensated output signal". Examiner seems to have ignored the words of the claim that describe the actual transformation. Examiner must consider ALL the words of the claim - "all words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

> *Third, the claims do not recite of transforming the frequency offsets to a dc offset (Office communication dated 04/27/2009, page 2, line 11).*

As above, Examiner has failed to consider the claim limitations, "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**", as required by Claim 1 AND "**subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal**", as required by Claim 5.

> Examiner submits that subtracting one signal from another signal is an abstract algorithm and does not comply with the requirement of 35 U.S.C. § 101. One skilled in the art could have performed the mathematical operation of subtraction by hand. A machine is not necessarily required to subtract one signal (direct current (DC) offsets) from another signal (said input signal to yield a frequency compensated output signal);

Examiner's above determination is similarly erroneous. Examiner seems to be stuck on the concept that ALL of the signals at issue are data only. In fact, there are "direct current" and "frequency" aspects at issue in the claims. Appellants respectfully submit that it would be all but impossible for a person to "mathematically subtract DC offset estimates from an input signal having DC offsets to yield a "frequency compensated output signal". Examiner has set forth no legitimate process where this can be accomplished "by hand".

Claims 3, 4 and 8 depend from allowable Claim 2 and are similarly allowable.

Claims 6 and 7 depend from allowable Claim 5 and are similarly allowable.

For the above reasons, favorable consideration of the appeal of the Final Rejection in the above-referenced application, and its reversal, are respectfully requested.

Respectfully submitted,

Ronald O. Neerings
Reg. No. 34,227
Attorney for Appellants

TEXAS INSTRUMENTS INCORPORATED
P.O. BOX 655474, M/S 3999
Dallas, Texas 75265
Phone: 972/917-5299
Fax: 972/917-4418

CLAIMS APPENDIX

CLAIMS ON APPEAL:

2. A method of frequency offset compensation, said method comprising the steps of:

receiving an input signal wherein frequency offsets have been translated to DC offsets;

first determining a current maximum peak value of said input signal;

second determining a current minimum peak value of said input signal;

calculating an average of said current maximum peak value and said current minimum peak value to yield a DC offset estimate; and

subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal;

wherein said step of determining said current maximum peak value comprises the steps of:

comparing said input signal with a previous maximum peak value;

if said input signal is greater than said previous maximum peak value, adding said previous maximum peak value to a first difference between said input signal and said previous maximum peak value, said first difference multiplied by a maximum charge coefficient to yield said current maximum peak value; and

if said input signal is not greater than said previous maximum peak value, subtracting a second difference between said previous maximum peak value and said input signal multiplied by a maximum discharge coefficient from said previous maximum peak value to yield said current maximum peak value.

3. The method according to claim 2, further comprising the step of generating said maximum charge coefficient and said maximum discharge coefficient in accordance with the occurrence of a specific event.

4. The method according to claim 2, further comprising the step of generating said maximum charge coefficient and said maximum discharge coefficient so as to limit the distance between detected maximum peaks and minimum peaks to within a predetermined range.

5. A method of frequency offset compensation, said method comprising the steps of:

receiving an input signal wherein frequency offsets have been translated to DC offsets;

first determining a current maximum peak value of said input signal;

second determining a current minimum peak value of said input signal;

calculating an average of said current maximum peak value and said current minimum peak value to yield a DC offset estimate; and

subtracting said DC offset estimate from said input signal to yield a frequency compensated output signal;

wherein said step of determining said current minimum peak value comprises the steps of:

comparing said input signal with a previous minimum peak value;

if said input signal is not greater than said previous minimum peak value, subtracting a first difference between said previous minimum peak value and said input signal, said first difference multiplied by a minimum discharge coefficient and subtracted from said previous minimum peak value to yield said current minimum peak value; and

if said input signal is greater than said previous minimum peak value, adding said previous minimum peak value to a second difference between said input signal and said previous minimum peak value, said second difference multiplied by a minimum charge coefficient to yield said current minimum peak value.

6. The method according to claim 5, further comprising the step of generating said minimum charge coefficient and said minimum discharge coefficient in accordance with the occurrence of a specific event.

7. The method according to claim 5, further comprising the step of generating said minimum charge coefficient and said minimum discharge coefficient so as to limit the distance between detected maximum peaks and minimum peaks to within a predetermined range.

8. The method according to claim 2, further comprising the step of calculating a moving average over N values of said average of said current maximum peak value and said current minimum peak value.

RELATED PROCEEDINGS APPENDIX

Appellants are not aware of any pending appeal or interferences in related applications.

EVIDENCE APPENDIX

No documents are being submitted with the Appeal Brief.